

UNDERWATER BRIDGE INSPECTION REPORT

STRUCTURE NO. 24514

MSAS NO. 109

OVER THE

SHELL ROCK CHANNEL

DISTRICT 6 - FREEBORN COUNTY, CITY OF ALBERT LEA



PREPARED FOR THE
MINNESOTA DEPARTMENT OF TRANSPORTATION

BY

COLLINS ENGINEERS, INC.

JOB NO. 5221 (CEI 142)

MINNESOTA DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

REPORT SUMMARY:

The substructure units inspected at Bridge No. 24514, the East and West Abutments and Piers 1 and 2, were found to be in good to satisfactory condition. The concrete abutments were in good condition with no structurally significant defects observed. However, the concrete encasements on the steel piles at the piers were heavily deteriorated and exhibited areas of notable section loss and exposed steel reinforcing. The steel H-piles were generally in satisfactory condition below the waterline and exhibited coating failure and moderate surface corrosion. The channel bottom appeared stable with no changes of concern since the previous inspection, although there was some aggradation of bottom material throughout the channel.

INSPECTION FINDINGS:

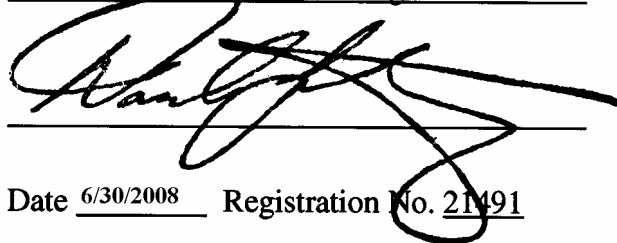
- (A) The concrete encasements on the steel piles at the piers exhibited areas of section loss with up to 6 inches of penetration and exposed reinforcing from the waterline to the bottom of the encasement. Map cracking was observed on all the encasements.
- (B) The steel H-piles exhibited 100 percent coating failure, with moderate surface corrosion and up to 1/4-inch-diameter scattered rust nodules. Up to 50 percent of the submerged surfaces were covered with nodules up to 1 inch in diameter and related 1/32 inch deep section loss.
- (C) A welded splice on the upstream steel H-pile of Pier 2 was observed 7.5 feet below the waterline and was in good condition.
- (D) An area of section loss, 2 feet high by 2 feet wide, was observed above the waterline on the West Abutment with up to 1 inch of penetration.

RECOMMENDATIONS:

- (A) The concrete encasements of the steel H-piles have deteriorated to the point where repair is not cost-effective. It should be noted that the encasements are for cosmetic and pile protection reasons, and that overall pier and pile integrity has yet to be adversely affected by the encasement problems. If full protective encasement is considered necessary, encasement replacement would be the appropriate remedial measure.
- (B) Reinspect the submerged substructure units at the normal maximum recommended (NBIS) interval of five (5) years.

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

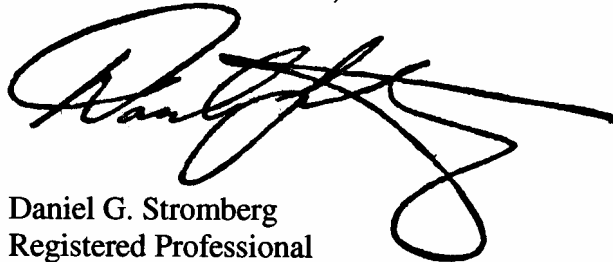
Daniel G. Stromberg

A large, stylized handwritten signature in black ink, appearing to read 'Dan G. Stromberg', is written over a horizontal line.

Date 6/30/2008 Registration No. 21491

Respectfully submitted,

COLLINS ENGINEERS, INC.

A large, stylized handwritten signature in black ink, appearing to read 'Dan G. Stromberg', is written over a horizontal line.

Daniel G. Stromberg
Registered Professional
Engineer, State of Minnesota

MINNESOTA DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION

1. BRIDGE DATA

Bridge Number: 24514

Feature Crossed: Shell Rock Channel

Feature Carried: MSAS No. 109

Location: District 6 - Freeborn County, City of Albert Lea

Bridge Description: The bridge consists of three spans of precast concrete double-tees. The superstructure is supported by two reinforced concrete abutments and two steel H-pile bents. The abutments are supported by footings on steel H-piles. The bents are labeled Piers 1 and 2 starting from the westerly direction.

2. INSPECTION DATA

Professional Engineer/Team Leader: Daniel G. Stromberg, P.E., S.E.

Dive Team: Clayton G. Brookins, Valerie Roustan

Date: October 22, 2007

Weather Conditions: Partly Cloudy, 48°F

Underwater Visibility: 2.0 feet

Waterway Velocity: 0.5 f.p.s

3. SUBSTRUCTURE INSPECTION DATA

Substructure Inspected: The East and West Abutments and Piers 1 and 2.

General Shape: The abutments each consist of a reinforced concrete breastwall and two perpendicular reinforced concrete wingwalls that are all founded on steel H-pile supported footings. The piers consist of a single line of 10 steel H-piles each. The upper portions of the steel H-piles are protected in a cylindrical concrete encasement that runs from the pile cap to below water.

Maximum Water Depth at Substructure Inspected: Approximately 11.6 feet.

4. WATERLINE DATUM

Water Level Reference: The top of the pile cap on the north end of Pier 1.

Water Surface: The waterline was approximately 7.3 feet below reference.

Waterline Elevation = 63.0

5. NBIS CODING INFORMATION (Minnesota specific codes are used for 92B and 113)

Item 60: Substructure: Code 5

Item 61: Channel and Channel Protection: Code 8

Item 92B: Underwater Inspection: Code B/10/07

Item 113: Scour Critical Bridges: Code I/92

Bridge is scour critical because abutment or pier foundation is rated as unstable due to observed scour at bridge site.

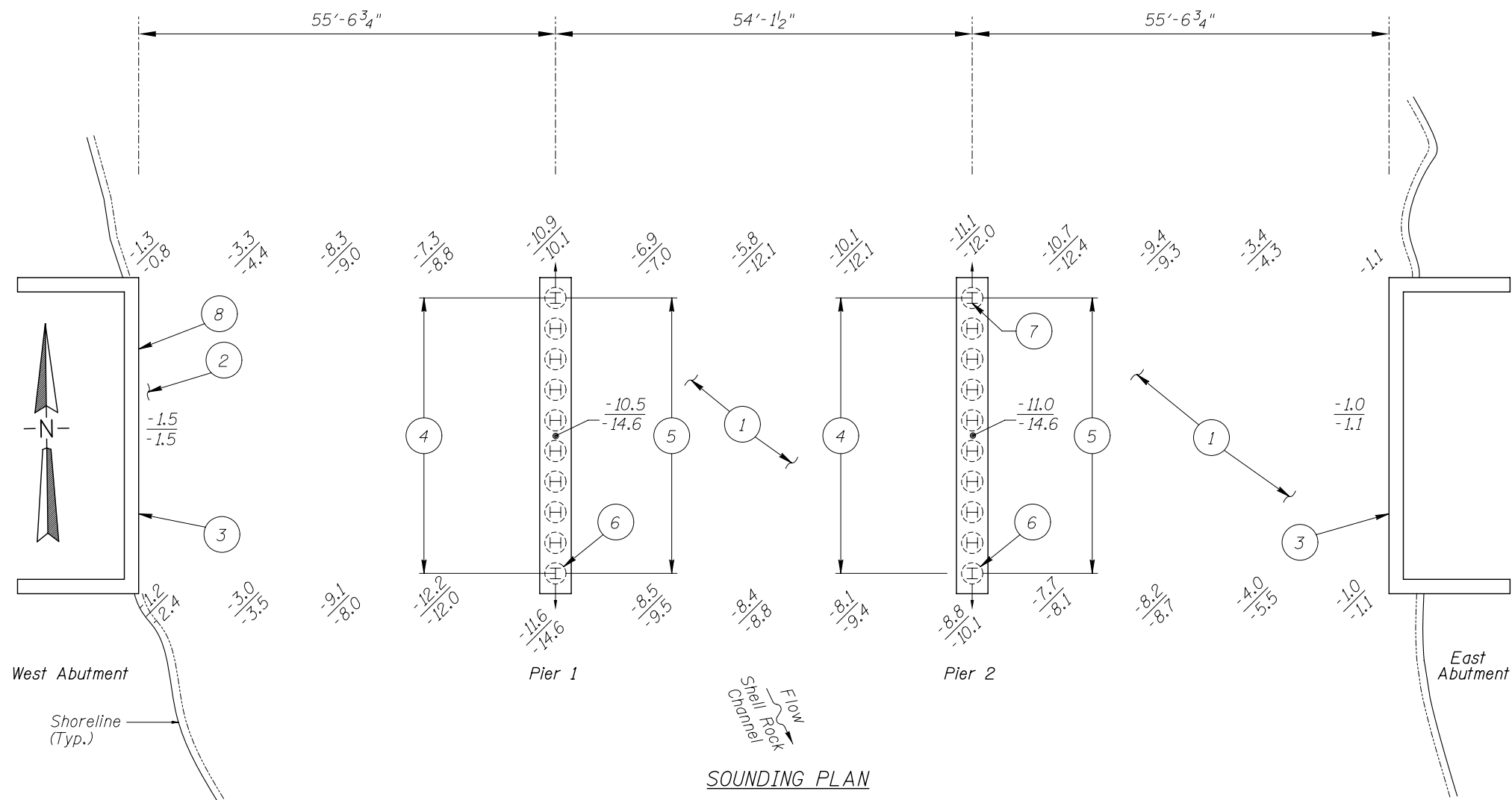
 Yes X No



Photograph 1. View of Pier 1, Looking Southeast.



Photograph 2. View of Pier 2, Looking Southwest.



GENERAL NOTES:

1. The East and West Abutments, and Piers 1 and 2 were inspected underwater.
2. At the time of inspection on November 2, 2002, the waterline was located approximately 7.9 feet below the top of the pier cap at the upstream end of Pier 1. This corresponds with a waterline elevation of 62.4.
3. Soundings indicate the water depth at the time of inspection and are measured in feet.
4. Soundings were taken parallel to the bridge at 1/4 point intervals between the substructure units.

INSPECTION NOTES:

1. The channel bottom consisted of silty sand with up to 1 foot of probe rod penetration.
2. The channel bottom consisted of sandy gravel, cobbles and rocks up to 2 feet in diameter with up to 8 inches of probe rod penetration.
3. Overall, the concrete abutments were in smooth and sound condition with no structurally significant defects observed.
4. The steel H-piles exhibited 100 percent coating failure with moderate surface corrosion with up to 1-inch-diameter rust nodules and 1/32-inch-deep pitting over approximately 50 percent of the surface area. Majority of nodules were scattered and 1/4 inch diameter in size.
5. The concrete encasements exhibited map cracking and widespread areas of section loss with up to 6 inches of penetration from the waterline to the bottom of the encasement. Frequent areas of exposed reinforcing were also noted.
6. Timber and steel formwork was still in place.
7. A welded splice of steel H-pile was observed 7.5 feet below the waterline and was in good condition.
8. An area of section loss, 2 feet high by 2 feet wide, was observed above the waterline with up to 1 inch of penetration.

Legend

-2.0	Sounding Depth (10/22/07)
-5.2	Sounding Depth (11/2/02)
H	Steel H-Pile
±	Battered Steel H-Pile

Note:

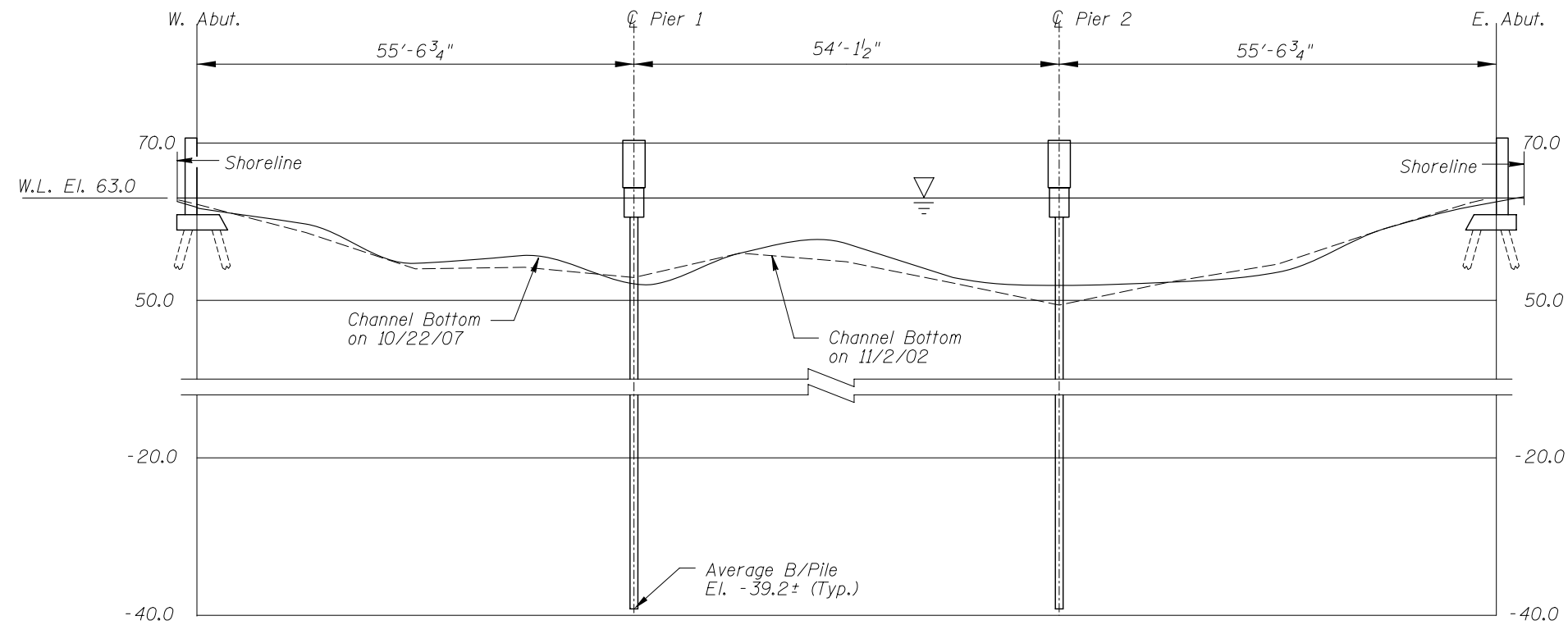
All soundings on 2007 waterline location.

MINNESOTA DEPARTMENT OF TRANSPORTATION UNDERWATER BRIDGE INSPECTION

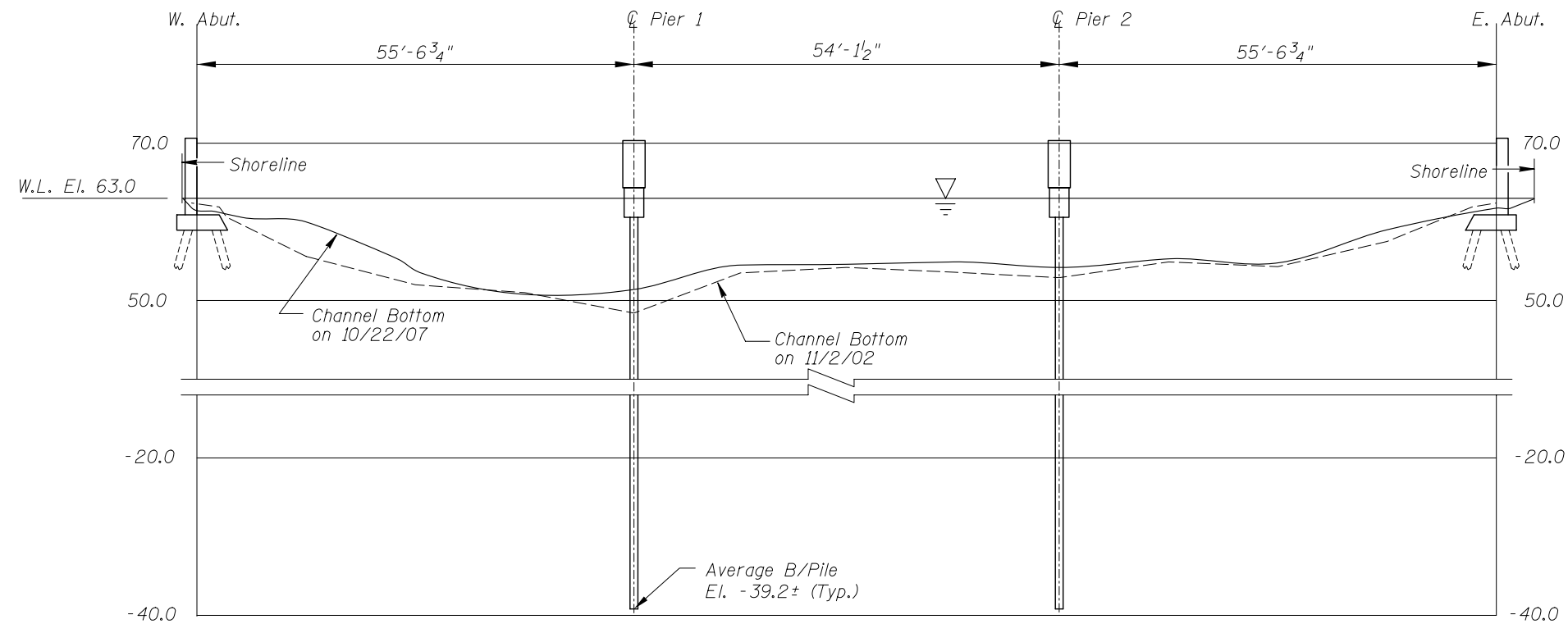
STRUCTURE NO. 24514
OVER THE SHELL ROCK CHANNEL
DISTRICT 6, FREEBORN COUNTY, CITY OF ALBERT LEA

INSPECTION AND SOUNDING PLAN

Drawn By: MDK	COLLINS ENGINEERS	123 North Wacker Drive Suite 300 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com	Date: OCT. 2007
Checked By: DGS			Scale: NTS
Code: 52210142			Figure No.: 1



UPSTREAM FASCIA PROFILE



DOWNSTREAM FASCIA PROFILE

Note: _____

Refer to Figure 1 for General Notes.

**MINNESOTA
DEPARTMENT OF TRANSPORTATION
UNDERWATER BRIDGE INSPECTION**

STRUCTURE NO. 24514
OVER THE SHELL ROCK CHANNEL
DISTRICT 6, FREEBORN COUNTY, CITY OF ALBERT LEA

**UPSTREAM AND DOWNSTREAM
FASCIA PROFILES**

Drawn By: MDK	COLLINS ENGINEERS <small>123 North Wacker Drive Suite 300 Chicago, IL 60606 (312) 704-9300 www.collinsengr.com</small>	Date: OCT. 2007
Checked By: DGS		Scale: 1"=20'
Code: 52210142		Figure No.: 2

MINNESOTA DEPARTMENT OF TRANSPORTATION
OFFICE OF BRIDGES AND STRUCTURES
DAILY DIVING REPORT

INSPECTORS: Collins Engineers, Inc. DATE: October 22, 2007

ON-SITE TEAM LEADER: Daniel G. Stromberg, P.E., S.E.

BRIDGE NO: 24514 WEATHER: Partly Cloudy, 48°F

WATERWAY CROSSED: Shell Rock Channel

DIVING OPERATION: X SCUBA SURFACE SUPPLIED AIR
 OTHER

PERSONNEL: Clayton G. Brookins, Valerie Roustan

EQUIPMENT: Scuba, U/W Light, Sounding Pole, Lead Line, Probe Rod, Camera, Scraper

TIME IN WATER: 4:10 p.m.

TIME OUT OF WATER: 4:40 p.m.

WATERWAY DATA: VELOCITY 0.5 f.p.s

VISIBILITY 2.0 feet

DEPTH 11.6 feet maximum at Pier 1

ELEMENTS INSPECTED: The East and West Abutments and Piers 1 and 2

REMARKS: The concrete of the abutments was in good condition with no structurally significant defects observed. The concrete encasements on the H-piles of the piers exhibited areas of section loss with up to 6 inches of penetration and exposed reinforcing from the waterline to the bottom of the encasement. Map cracking was also observed on all the encasements. The steel H-piles exhibited 100 percent coating failure with moderate surface corrosion with up to 1/4-inch-diameter rust nodules. Up to 50 percent of the submerged pile surfaces were covered with nodules up to 1 inch in diameter and related 1/32 inch section loss. The channel bottom appeared stable with no significant scour and some aggradation since the last inspection.

FURTHER ACTION NEEDED: X YES NO

The concrete encasements of the steel H-piles have deteriorated to the point where repair is not cost-effective. It should be noted that the encasements are for cosmetic and pile protection reasons, and that overall pier and pile integrity has yet to be adversely affected by the encasement problems. If full protective encasement is considered necessary, encasement replacement would be the appropriate remedial measure.

Reinspect the submerged substructure units at the normal maximum recommended (NBIS) interval of five (5) years.

MINNESOTA DEPARTMENT OF TRANSPORTATION
OFFICE OF BRIDGES AND STRUCTURES

UNDERWATER INSPECTION CONDITION RATING FORM

BRIDGE NO. 24514
INSPECTORS Collins Engineers, Inc.
ON-SITE TEAM LEADER Daniel G. Stromberg, P.E., S.E.
WATERWAY CROSSED Shell Rock Channel

INSPECTION DATE October 22, 2007

NOTE: USE ALL APPLICABLE CONDITION DEFINITIONS AS DEFINED IN THE MINNESOTA RECORDING AND CODING GUIDE INCLUDING GENERAL, SUBSTRUCTURE, CHANNEL AND PROTECTION, AND CULVERTS AND WALL DEFINITIONS TO COMPLETE THIS FORM.

CONDITION RATING

UNIT REFERENCE NO.	UNIT DESCRIPTION	MAXIMUM DEPTH OF WATER	SUBSTRUCTURE						CHANNEL					GENERAL					
			PILING	COLUMNS, SHAFTS, OR FACES* (ENCASEMENTS)	FOOTINGS	DISPLACEMENT	OTHER	OVERALL SUBSTRUCTURE CONDITION CODE*	SCOUR	EMBANKMENT EROSION	EMBANKMENT PROTECTION	OTHER (DRIFT/DEBRIS)	OVERALL CHANNEL & PROTECTION CONDITION	CONCRETE	STEEL	TIMBER	LOSS OF SECTION	PREVIOUS REPAIR OR MAINTENANCE	OTHER
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	West Abutment	1.5'	N	7	N	9	N	7	8	N	N	N	8	7	N	N	N	N	N
	Pier 1	11.1'	7	5	N	9	N	5	8	N	N	N	8	5	7	N	N	N	N
	Pier 2	11.6'	7	5	N	9	N	5	8	N	N	N	8	5	7	N	N	N	N
	East Abutment	1.1'	N	7	N	9	N	7	8	N	N	N	8	7	N	N	N	N	N

*UNDERWATER PORTION ONLY

REMARKS: The concrete of the abutments was in good condition with no structurally significant defects observed. The concrete encasements on the H-piles of the piers exhibited areas of section loss with up to 6 inches of penetration and exposed reinforcing from the waterline to the bottom of the encasement. Map cracking was also observed on all the encasements. The steel H-piles exhibited 100 percent coating failure with moderate surface corrosion with up to 1/4-inch-diameter rust nodules. Up to 50 percent of the submerged pile surfaces were covered with nodules up to 1 inch in diameter and related 1/32 inch section loss. The channel bottom appeared stable with no significant scour and some aggradation since the last inspection.

NOTES: ATTACH SKETCHES AS NEEDED, IDENTIFY REMARK BY REFERRING TO UNIT REFERENCE NO. AND REMARK NO. USE GENERAL SECTION TO IDENTIFY OVERALL PRESENCE OF SPALLS, CRACKS, CORROSION, ETC.